

NOTES ON THE USE OF PHOTOGRAPHY IN TAXONOMIC WORK.

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Dos Passos (1946) has described a practical method for photographing insect specimens by the use of the Leica and the sliding focusing copying attachment, or by the fixed-focus method. Another method is the use of a Speed-graphic with photo-flood lamps or flash. A still simpler method, ideal for photographing type specimens or other during travel, because of the minimum of equipment to be carried, is described below.

This method is essentially a simplification of the equipment discussed by Ross (1953) for photographing living insects in action. The only essential equipment is an Exakta camera with bellows extension (Novoflex or Belloscope) and cable release. Two corks, cut to the correct heights, support the back of the camera so a tripod or swivel attachment is not needed. The camera with extended bellows is placed horizontally on a steady table, the corks put in place and a strip of cellotape used to fix the terminal end of the base of the bellows attachment to the table. A light meter is helpful, but can be dispensed with after experience has demonstrated the latitude in exposure permitted by the equipment. A sheet of standard tables for the different types of lenses indicating the exposure factor for the various lengths of extension of the bellows is provided by the Exakta Company and enables one to determine immediately, with the light meter, the exposure to use. For maximum depth of focus, the exposures are always made at *f.* 22, the smallest opening of the ordinary Tessar *f.* 3.5 50 mm. lens, which is the most practical one for this purpose. Thus the only variables are the length of time of exposure and the focusing. The latter is accomplished by extending the bellows attachment to the proper degree to obtain the desired enlargement or to keep the insect, if large, within the field. Then the subject is moved forward and backward, with the lens aperture wide open, until perfect focus is attained, sighting through the lens by means of the reflex finder. The insect is pinned onto the vertical portion of piece of cork-sheet pinned to a horizontal piece for support. Lighting may be provided by two desk lamps or preferably by one microscope lamp and one desk lamp, placed on opposite sides of the specimen, the desk lamp on the side towards the window. It is desirable constantly to use the same illumination for uniform results. However, when one is travelling to foreign countries this may not be convenient,

particularly since transformers and various kinds of wall plugs would be necessary to adjust to the various circumstances in different countries. One of the new model portable electronic flash outfits may be the best solution.

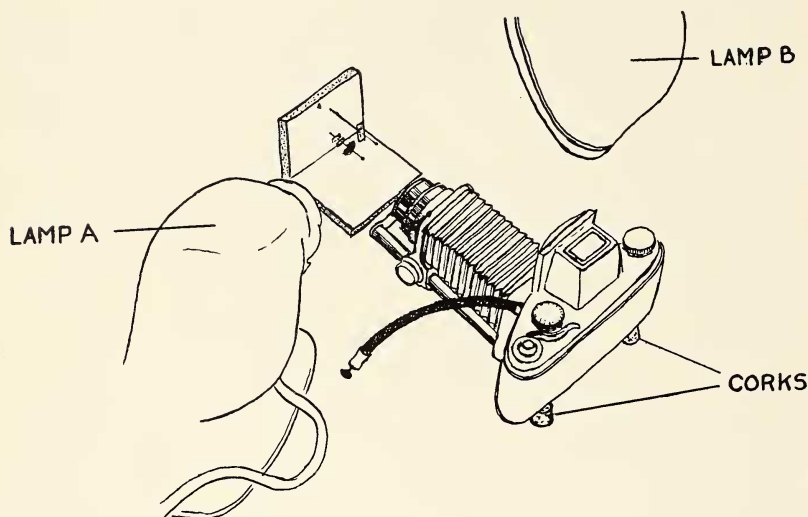


Fig. 1. Sketch of photographic assembly.

Recently I made a two and one-half month trip in Europe, during which time I visited 14 museums and photographed types in most of them. Photographs were taken of about 1600 type specimens at a cost of less than ten cents each. The 35 mm. film of speed 50 was purchased in 100 foot or 25 or 17 meters rolls and cut and rolled in cassettes by myself, but the developing and enlarging, to 7×10 cm. size was done commercially. By doing one's own developing and enlarging the unit cost would be much reduced. My equipment consisted only of the Exakta and the $8 \times 8 \times 15$ cm. box containing bellows, cable release, light meter, cork-sheet stand and cork supports, plus the sheet of exposure factor data and paper for recording the names and other data, by number for each roll, of the specimens photographed. In labelling the prints later those of each film roll were arranged in the order on the negative and the data transposed from the record sheet. To avoid chance of errors in assigning data, part of the name-label can be included in the field of the picture, or a small label written and pinned beside the insect, or the position of antennae or legs indicated after the name on the list.

After my return I mounted the enlargements individually on 5×8 inch ruled file cards, trimming the prints and glueing them in succession on left, middle and right side of the cards, so the resulting file would not be bulging on one side. Before attaching the print the name and data were typed on the top line of the card, leaving room above for addition of current or later generic assignment. Thus, a sample is as follows:

Clythra longipes Fabr. T 4 K-7-19 Kiel coll. dr. 9

Of the abbreviations, "T" stands for type, followed by a figure for the number of specimens in the series. The formula K-7-19 indicates the 19th specimen on the seventh film exposed at Kopenhagen. Kiel coll dr. 9 indicates that the specimen is in drawer 9 of the beetle section of the Fabricius collection from Kiel ("Fabricius' own collection"), which is now at Kopenhagen in addition to the Kopenhagen Fabricius collection, which contains a comparable number of types. To indicate the various museums, abbreviations were used as follows: B—British Museum; S—Riksmuseum, Stockholm; K—Universitetets Zoologiska Museum, Kopenhagen; A—Zoological Museum, Amsterdam; L—Rijksmuseum, Leiden; Brux—Institute Royale des Sciences Naturelles, Bruxelles; Senck—Senckenbergisches Natur-Museum, Frankfurt; V—Naturhistorisches Museum, Vienna; P—Muséum d'Histoire Naturelle, Paris. After all prints were mounted, correctly labelled, and the negatives marked B-9, etc., the cards were arranged systematically, and the file serves as a reference of the greatest value, to which may be added notes, or detail sketches, as desired. In the case of species described long ago, at least, this method of reference may be much more useful than the original descriptions.

Some of the pictures were taken with Kodachrome or Agfa color film. In these cases the cardboard mounts are slipped into cellophane envelopes attached to the file cards with cellotape and trimmed in front so the slides may be easily slipped out for viewing. Thus they may be kept in the same file with black and white pictures.

This method is applicable, with satisfying results, to many types of insects, ranging in size from less than 2 mm. to 50 mm. in length, or larger if they are taken in sections or if a short extension tube is substituted for the bellows. Smaller insects may be taken using the bellows plus an extension tube, or by using a microscope with attachment.

Another practical use of this method in taxonomy is to photograph specimens to be illustrated, enlarging to the proper size and

then making a tracing for the actual drawing. This gives the advantages of freedom from the use of "grate" or camera lucida, and the attainment of exact outlines, proportions, pattern and puncture arrangement. In other words, one gains the advantages of a photograph plus those of a drawing, together with the lower cost of reproduction by zinc cut.

LITERATURE CITED

- dos Passos, C. F. 1946. The photography of Lepidoptera. Bull. Brooklyn Ent. Soc. 40: 166-169, 4 figs.
Ross, E. S. 1953. Insects close up. 80 pp., 125 figs. University of California Press.

(Since the above was in press I obtained a Lumax electronic flash operating on four flashlight batteries. Though adding three pounds weight to the equipment it provides uniform lighting, permits quick exposures and dispenses with the light meter.)

Paratrioza cockerelli (Sulc.) on celery.—Adult potato psyllids, *P. cockerelli*, were observed in abundance on a field of potatoes at Springville, Utah, on September 23, 1953. This crop had been made worthless by psyllid yellows. On the same date, adult *P. cockerelli* were collected quite commonly on celery in every field examined at Springville, Provo, American Fork, Lehi (Saratoga area) and at Farmington. Adults continued to be present on celery, including fields at Midvale, wherever it was examined through mid-October. This pest was more numerous over much of Utah during 1953 than I had observed it to be for several years.—G. F. KNOWLTON, Logan, Utah.